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ABSTRACT

One of nine brief guides for special educators on using computer technology, this guide focuses on computer use with learning disabled students for such purposes as direct instruction and development of communication skills. It is noted that the learning disabled student may possess certain characteristics which require the kind of modification of instruction that computers can provide. Possible hardware modifications are briefly considered. Criteria for selecting appropriate software for learning disabled students in general are provided as are specific criteria for software selected students with dyslexia or attention deficit disorder. Tool software, such as word processing programs are also recommended for these students. Resources listed include five readings, four organizations, seven periodicals, four language development software packages, four math software packages, four reading software packages, four spelling and writing software packages, four visual and perceptual software packages, and three speech synthesizers. (DB)

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Center for Special Education Technology

Tech Use Guide

Using Computer Technology

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Learning Disabilities

Computer technology can provide a full spectrum of possibilities for teaching students with learning disabilities. The computer can be used to instruct students directly, tailoring each presentation to fit the individual student's needs. It can also be used to aid communication skills, and with the addition of hardware devices, the computer can be used to further enhance instruction.

Learner Characteristics

The student with learning disabilities may possess any of a number of learning difficulties which require a modification of the instructional method or material used. A learning problem may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations. These students need ample practice and many opportunities to respond in the learning situation. Computer based learning is one instructional alternative that may assist a student with learning disabilities to reach his or her academic potential.

Hardware

For many students with learning disabilities it is not necessary to modify the standard computer hardware. However, for some, hardware devices or peripherals may be used to assist a student input data or select responses. For example, a touch screen or light pen may be used in place of the keyboard. A mere touch of the screen or a pointing of a pen is all that's required. A graphics tablet may also be used to input data. A speech synthesizer can be added to provide spoken output. Screen text can be "read" by the synthesizer, minimizing reading skills needed to work through a lesson.

Software

The way in which a microcomputer can be used to assist in the instruction of students with learning disabilities depends largely on the type of software selected. Since students with learning disabilities may exhibit a combination of characteristics that mildly, moderately, or severely impair their learning, many questions about it need to be addressed. Some examples include:

- Are the directions clear and appropriate for the student's level?
- Is the reading level throughout the program appropriate and consistent for the task?
- How much teacher supervision is required?
- How much eye-hand coordination is required?
- Is a limited number of appropriate responses allowed before an answer is given?
- Does the program allow the student to exit at any point, save what has been done, and return to the program later?
- Does the program match the student's skill levels and needs?
- Can alternative input devices, such as joysticks, graphics tablets, or light pens, be used?

Many software programs have a variety of uses that cover a number of content and skill areas. Once you begin to look at process and academic skills for which software is appropriate, you may be surprised at the number of programs available that can be used with students with learning disabilities.

Dyslexia is a diagnosis often used for children of normal intelligence who are unable to read, even after being exposed to similar instruction with their peers. The reading difficulties related to this disorder are broad. The primary curriculum areas of deficit identified are reading and auditory language. Software should include content that helps with sound/symbol associations, sight words, phonics, comprehension, grammar, written expression, writing organization, and auditory perception. Software selected for individuals with dyslexia should have the following characteristics:

- content that can be changed to allow the teacher to create lessons in the specific areas of need.
- voiced programs to provide the child with auditory feedback for the written text to reinforce letter/sound associations, word differences, and word or sentence organization.

Attention Deficit Disorder (ADD) is a diagnosis for children with a broad range of learning problems related to attention deficits, impulsivity, and hyperactivity. ADD is not content specific thus software selected for this child

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can cross all curriculum areas. However, there are three curriculum areas in which children with ADD often need supplemental instruction: concept development, perceptual development, and socialization. Software selected for a child with ADD should have the following characteristics:

- Session length should be adjustable to allow incremental training of attention.
- Data collection should be a component of the software providing the teacher and the student with precise information about the learning progress, in order to make appropriate program changes.
- Reinforcement should be selective and available in a variety of types thus allowing individualization in order to keep the child's attention.
- Speed should be adjustable to allow fast paced programs to keep the child's attention but also allow enough time for the child to think before acting.

Word Processing

The use of content-free software in educational settings is on the increase. Educators are discovering that tool software, such as word processing programs, can be used effectively to teach writing to students with learning disabilities. Most students with learning disabilities lack the strategies more experienced writers have for managing the basic planning, composing, and editing process that occurs in writing. Word processing gives students with learning disabilities an alternative approach to traditional writing tasks. Most importantly, it produces a neat copy of the student's work. The neat version of written work positively affects the student's perception of his or her work and can increase motivation. Tedious copying tasks can be avoided because text can be saved on a disk. Writing can be taught as a process involving repeated drafts. Thus, time can be spent on the process of writing rather than on the mechanics of handwriting.

Getting Started

Most experts agree that interested and enthusiastic teachers are an important factor in successful computer use in the classroom. With some basic information and skills, students can participate in positive learning experiences. While most children are curious about computers, they need guidance as they learn to use the technology. Identify curriculum areas that can be supplemented through the use of microcomputers. Think about how the computer will be used in the classroom. Start slowly and gradually increase the use of computers and watch the student's confidence grow.

Readings

Howell, R., Sidorenko, E., & Jurica, J. (1987). The effects of computer use on the acquisition of multiplication facts by a student with learning disabilities. Journal of Learning Disabilities, 20, 336-341.

Johnson, G., Gersten, R., & Carnine, D. (1987). Effects of instructional design variables on vocabulary acquisition of LD students: A study of computer-assisted instruction. Journal of Learning Disabilities, 20, 206-213.

Lee, W. W. (1987). Microcomputer courseware production and evaluation guidelines for students with learning disabilities. Journal of Learning Disabilities, 20, 436-438.

MacArthur, C. & Graham, S. (1987). LD students composing under three methods of text production: Handwriting, word processing, and dictation. Journal of Special Education, 21, 22-42.

Morocco, C. (1987). Teachers, children and the magical writing machine. Instructional contexts for word processing with learning disabled children (Final Report, EDC Writing Project). Cambridge, MA: Education Development Center.

Resources

Association for Children with Learning Disabilities (ACLD), 4156 Library Road, Pittsburgh, PA 15234, 412-341-1515.

The Council for Exceptional Children, Division for Learning Disabilities, 1920 Association Drive, Reston, VA 22091, 703-620-3660, 800- 873-8255.

National Information Center for Children and Adults with Handicaps (NICHCY), P.O. Box 1492, Washington, DC 20013, 800-999-5599.

Foundation for Children with Learning Disabilities (FCLD), 99 Park Avenue, New York, NY 10016, 212-687-7211.

Periodicals

Closing The Gap, P.O. Box 68, Henderson, MN 56044.

The Computing Teacher, University of Oregon, 1787 Agate Street, Eugene, OR 97403.

Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Journal of Learning Disabilities, 5341 Industrial Oaks Boulevard, Austin, TX 78735-8809.

Learning Disabilities Focus, A Publication of the Division of Learning Disabilities, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Learning Disabilities Research, A Publication of the Division of Learning Disabilities, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Special Times Catalog, Cambridge Development Laboratory, 214 3rd Avenue, Waltham, MA 02154. Available free of charge.

Language Development Software Resource List

Cave Girl Clair, Rhiannon Software, 3717 Titan Drive, Richmond, VA 23225, 804-272-7770.

First Categories, Laureate Learning Systems, Inc., 110 East Spring Street, Winooski, VT 05404, 802-655-4755.

Gertrude's Puzzles, The Learning Company, 6493 Kaiser Drive, Fremont, CA 9455, 800-852-2255.

Language Development Series, Scott, Foresman & Company, 1900 East Lake Avenue, Glenview, IL 60025, 312-273-5900.

Math Software Resource List

Arcademic Skill Builders in Math, DLM Teaching Resources, One DLM Park, Allen, TX 75002, 800-527-4747.

Clock Works, MECC, 3490 Lexington Avenue North, St. Paul, MN 55126, 612-481-3500.

Math for Everyday Living, Educational Activities, Inc., 1937 Grand Avenue, Baldwin, NY 11510, 516-223-4666.

Rocky's Boots, The Learning C[illegible]ny, 6493 Kaiser Drive, Fremont, CA 9455, 800-85[illegible].

Reading Software Resource List

Alphabet with Tom and Andy, Dunamis, Inc., 2856 Buford Highway, Duluth, GA 30136, 404-476-4934.

Arcademic Skill Builders in Language Arts, DLM Teaching Resources, One DLM Park, Allen, TX 75002, 800-527-4747.

Contained Reading Series, A/V Concepts Corporation, 30 Montauk Boulevard, Oakdale, NY 11769, 516-567-7227.

GED Prep, Krell Software Corporation, 1320 Stony Brook Road, Stony Brook, NY 11790, 516-751-5139.

Spelling and Writing Software Resource List

Complete Spelling Program, SLED Software, P.O. Box 16322, Minneapolis, MN 55416, 612-926-5820.

Kittens, Kids, and a Frog, Hartley Courseware, Inc., 133 Bridge Street, Diamondale, MI 48821, 517-646-6458.

Word Attack, Davidson & Associates, Inc., 6069 Groveoak Place, Rancho Palos Verdes, CA 90274, 213-373-0971.

Writer Rabbit, The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555, 800-852-2255.

Visual and Perceptual Software Resource List

Captain: Cognitive Training System, Network Services, 1915 Huguenot Road, Richmond, VA 23235, 804-379-2253.

Memory Building Blocks, Sunburst Communications, 39 Washington Avenue, Pleasantville, NY 10570, 914-769-5030.

Memory Match, Hartley Courseware, Inc., 133 Bridge Street, Diamondale, MI 48821, 517-646-6458.

Positional Concepts, Educational Program Development, P.O. Box 393, Osgoode, ON, Canada K0A 2W0, 613-826-2294.

Speech Synthesizers

Cybertalker, Cyberon Corporation, 1175 Wendy Road, Ann Arbor, MI 48103, 313-665-8512.

Echo+and Pc2 Speech Synthesizer, Street Electronics Corporation, 1140 Mark Avenue, Carpinteria, CA 93013, 805-684- 4593.

Intex Talker, Intex Micro Systems, Corporation, 725 South Adams Road, Suite L8, Birmingham, MI 48011, 313-540-7601.

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- Selecting Software
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- Preschool Children
- Hearing Impairments
- Physical Disabilities
- Visual Impairments
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